Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Big Bottom Creek

Water Body Segment at a Glance:

County: Ste. Genevieve
Nearby Cities: Rocky Ridge
Length of impairment: 0.5 miles
Pollutants: Biochemical Oxygen Demand (BOD) and Volatile Suspended Solids (VSS)
Source: Lake Forest Subdivision


State map showing location of watershed

TMDL Priority Ranking: High

Description of the Problem

Beneficial uses of Big Bottom Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Human Health Protection (Fish Consumption)

Use that is impaired

- Protection of Warm Water Aquatic Life

Standards that apply

- The Missouri Water Quality Standard (WQS), found in 10 CSR 20-7.031 Table A, for dissolved oxygen (related to BOD) in streams is 5.0 milligrams per liter (mg/L), or the natural dissolved oxygen profile of the stream, whichever is less.
- The standards for volatile suspended solids (VSS) may be found in the general criteria section of the WQS at 10 CSR 20-7.031(3)(A) and (C). Here it states:
  - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
  - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.

Background Information and Water Quality Data

The Department of Natural Resources (department) made visual inspections of Big Bottom Creek below the Lake Forest Estates Subdivision wastewater treatment plant (WWTP) twice during summer low flow conditions in the past seven years. These inspections showed a scarcity of aquatic life. In addition, almost all of the life forms that were present are known to be tolerant of pollution. These conditions are characteristic of streams impacted pollution from wastewater (or organic

pollution). Wastewater high in Biochemical Oxygen Demand (BOD) reduces the amount of dissolved oxygen (DO) in the stream. Most aquatic organisms require high levels of oxygen to survive. In addition, VSS (suspended algae and sewage sludge) can settle onto the bottom of a stream and smother natural substrates (materials in the streambed), aquatic invertebrate animals (like crayfish and water insects) and fish eggs. In 2004, the department conducted water chemistry monitoring. The data are listed in the table below.

Like all wastewater discharges in Missouri, the Lake Forest WWTP has to meet the requirements of a discharge permit issued by the department. To correct the problems mentioned above, changes have been made to the discharge permit that will improve the quality of the wastewater discharge and result in improved water quality in Big Bottom Creek. The WWTP was upgraded in 2003 to meet these new permit limits and went online December 2004. More water chemistry data was collected in 2005 and 2006 to monitor the effect of the upgrades. These data were considered when the permit came up for renewal in 2006. The department plans to submit the renewed permit in lieu of a TMDL.

2004 Data for Big Bottom Creek – Lake Forest Lagoon

Site #	Site Name	Year	Mo	Day	Time	Flow	C	DO	TSS	BOD	CBOD
	Big Bottom Cr. just above Lake Forest Lgn.	2004	6	9				5.7	5	2	
1	Big Bottom Cr. just below Lake Forest Lgn.	2004	6	9				4.8	14	9.1	
1	Big Bottom Cr. just below Lake Forest Lgn.	2004	7	1	1210	0.2	26	4.4			3.17
1	Big Bottom Cr. just below Lake Forest Lgn.	2004	7	2	636	0.2	24	1.1			2.91
	Lake Forest Lagoon Effluent	2004	6	9				6.4	24	14.4	
2	Big Bottom Cr. just above Indian Cr.	2004	7	1	1250	0.05	18	4.7			0.99
2	Big Bottom Cr. just above Indian Cr.	2004	7	2	546	0.03	17	4.2			0.99
3	Big Bottom Cr. near mouth	2004	7	1	1320	0.25	23	7.4			0.99
3	Big Bottom Cr. near mouth	2004	7	2	610	0.25	22	4.4			0.99

Key to acronyms: Mo=Month; Flow in cubic feet pr second; C=Temperature in degrees Celsius; TSS=Total Suspended Solids in mg/L; CBOD=Carbonaceous Biochemical Oxygen Demand in mg/L

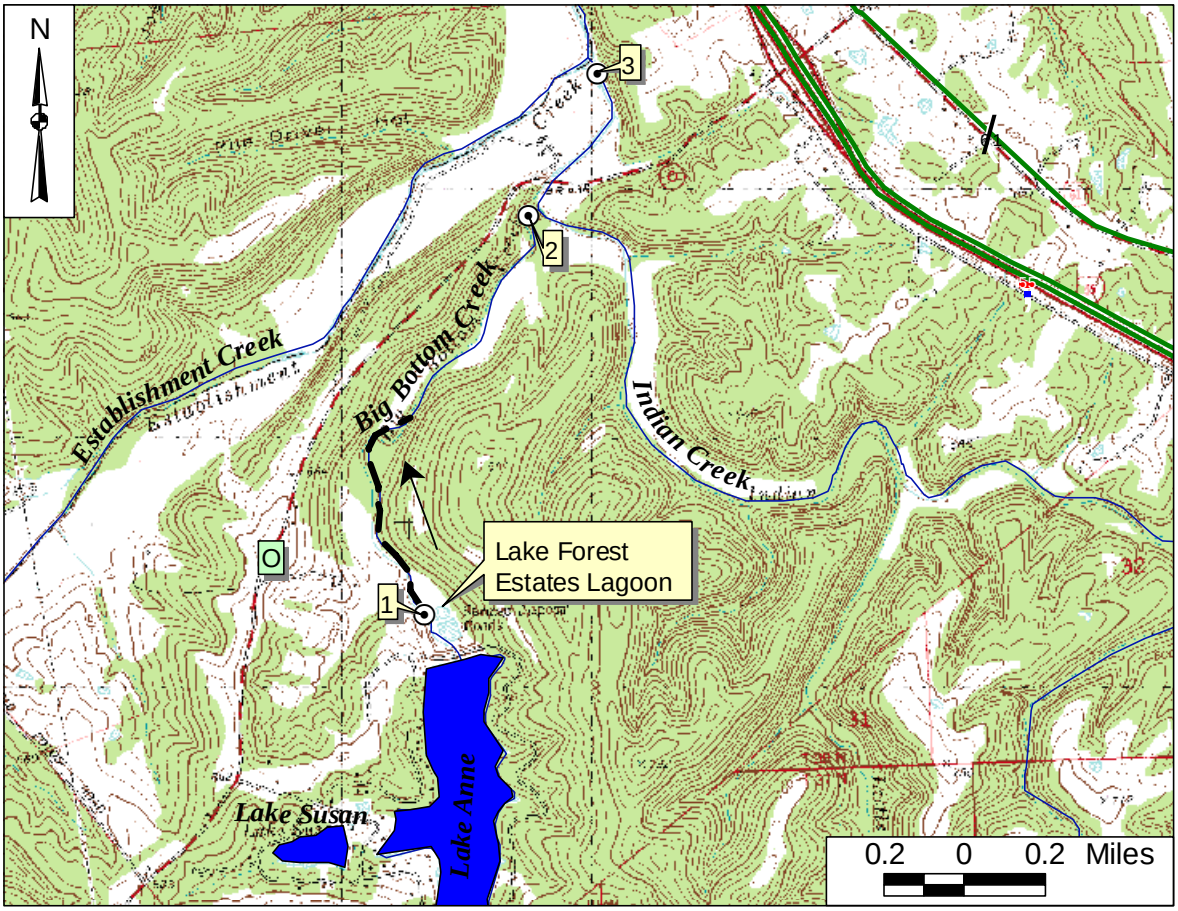
2005 Data for Big Bottom Creek

Site #	Site Name	Year	Mo	Day	Time	Flow	C	DO	CBOD
1	Big Bottom Cr. just below Lake Forest Lgn.	2005	4	19	524		17	1.1	
1	Big Bottom Cr. just below Lake Forest Lgn.	2005	4	19	1250		20	8.2	
1	Big Bottom Cr. just below Lake Forest Lgn.	2005	6	9	635	0.05	24	0.8	8
1	Big Bottom Cr. just below Lake Forest Lgn.	2005	6	9	1100	0.05	25	1.9	6.5
2	Big Bottom Cr. just above Indian Cr.	2005	4	19	548		13	4.2	
2	Big Bottom Cr. just above Indian Cr.	2005	4	19	1347		17	9	
2	Big Bottom Cr. just above Indian Cr.	2005	6	9	539	0.02	14	2.4	0.99
2	Big Bottom Cr. just above Indian Cr.	2005	6	9	1125	0.03	14	2.6	0.99
	Indian Cr. near mouth	2005	4	19	555		13	6.3	
	Indian Cr. near mouth	2005	4	19	1426		21	13	
	Indian Cr. near mouth	2005	6	9	535	0.05	20	4.6	0.99
	Indian Cr. near mouth	2005	6	9	1117	0.05	25	12	
3	Big Bottom Cr. near mouth	2005	4	19	607		14	6	
3	Big Bottom Cr. near mouth	2005	4	19	1500		21	13	
3	Big Bottom Cr. near mouth	2005	6	9	602	0.1	21	2.8	0.99
3	Big Bottom Cr. near mouth	2005	6	9	1147	0.1	24	9.3	

2006 Data for Big Bottom Creek

Site	Location	Year	Mo	Day	Time	C	DO
1	Below (~50 feet below) Lake Forest Estates Outfall	2006	8	18	616	24.8	4.7
		2006	8	18	1152	28.3	7.2
2	Big Bottom Creek just above confluence with Indian Creek	2006	8	18	643	20.7	5
		2006	8	18	1303	26.8	6.9
	Indian Creek near mouth	2006	8	18	643	(dry)	
		2006	8	18	1303	(dry)	
3	Big Bottom Creek near mouth	2006	8	18	700	20.9	2
		2006	8	18	1321	24.3	3.4

Big Bottom Creek near Rocky Ridge, Ste. Genevieve County, Missouri, Showing Impaired Segment and Sample Sites



Impaired Segment Direction of Flow

For more information call or write:
Missouri Department of Natural Resources, Water Protection Program
P.O. Box 176, Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 751-1300 office or (573) 522-9920 fax
Program Home Page: www.dnr.mo.gov/env/wpp/index.html